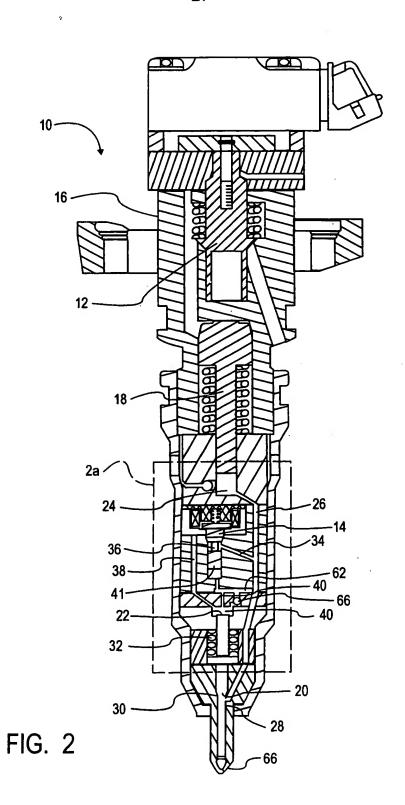


FIG. 1 PRIOR ART



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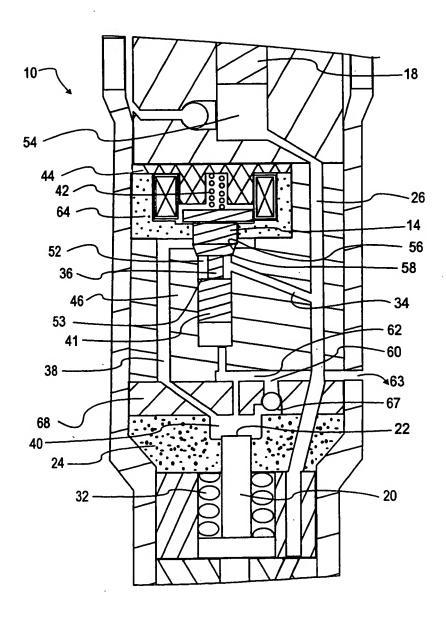


FIG. 2a

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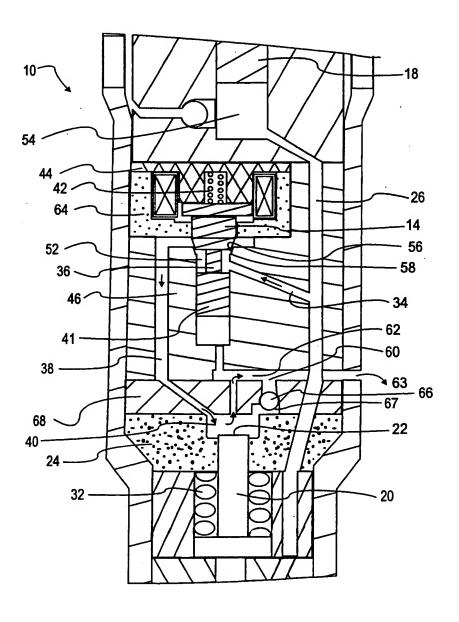


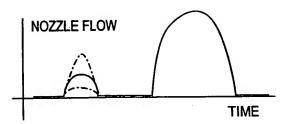
FIG. 2b

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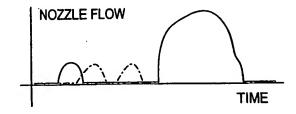
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FIG. 3

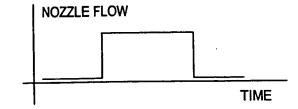
CASE 1



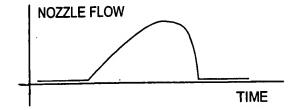
CASE 2



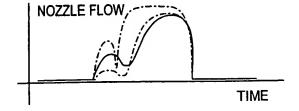
CASE 3



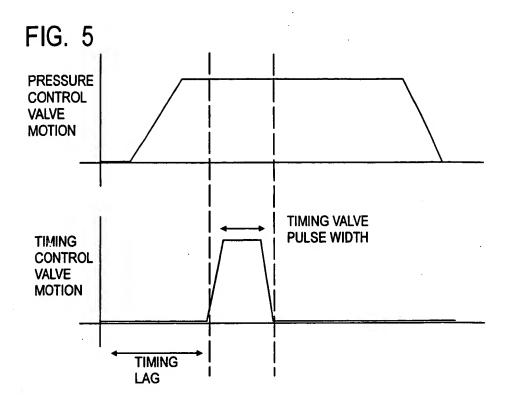
CASE 4

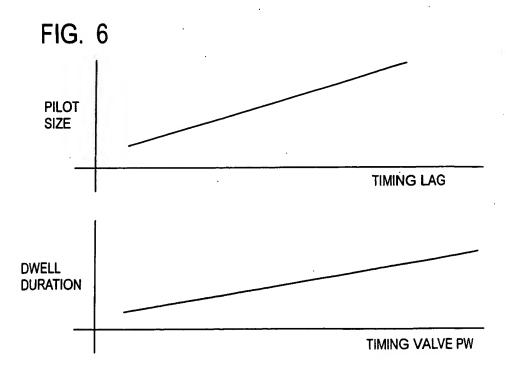


CASE 5



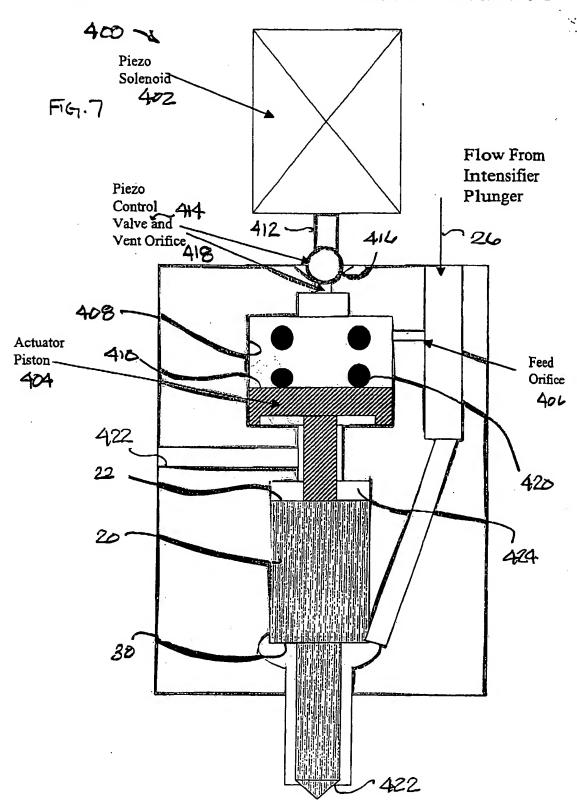
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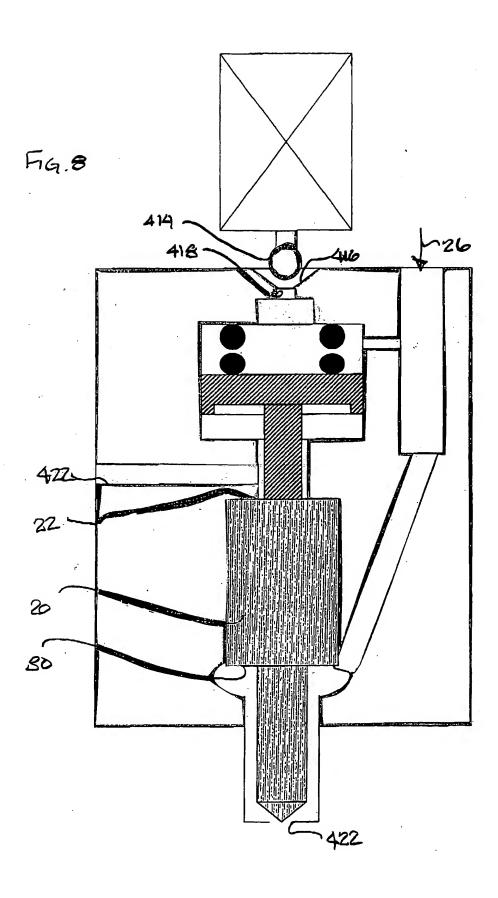




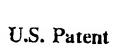
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Piezo Controlled Direct Needle Actuation





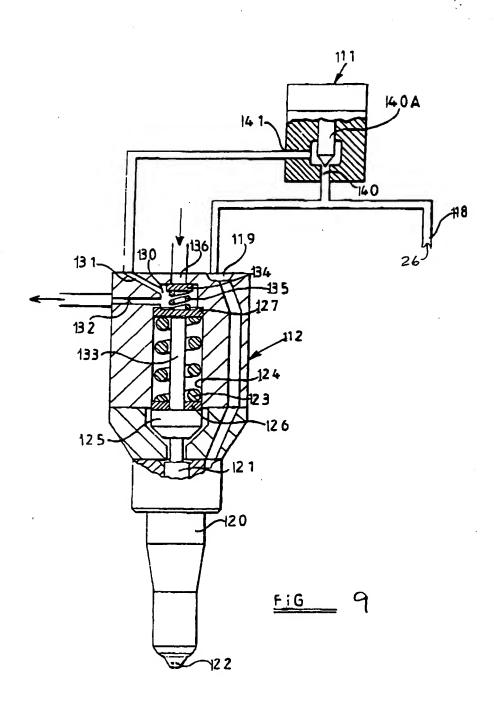
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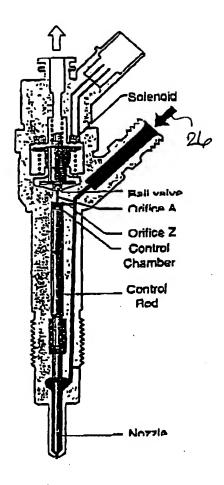


Fig. 10a

